For Dr. Michael Lairmore, The One Health Philosophy Is In His DNA

One Health is a strategic initiative taking place worldwide for expanding interdisciplinary collaborations, working at the interface of animals, people and the environment to solve complex issues that impact public and animal health, and conservation efforts. The synergism is expected to advance health care for the 21st century by expanding the scientific knowledge base and improving both education and clinical care. The advances are also expected to help address complex health issues facing our society and the planet.

The One Health Institute grew out of the U.C. Davis School of Veterinary Medicine's deep commitment to the One Health approach and is home to the well-established Wildlife Health Center. Michael D. Lairmore, DVM, PhD, DACVP, DACVM, is the dean of the U.C. Davis School of Veterinary Medicine, and presides over the William R. Pritchard Veterinary Medical Teaching Hospital, the California Animal Health and Food Safety Laboratory System and more.

According to Dr. Lairmore, the Association of American Veterinary Medical Colleges (AAVMC) made One Health a priority. "I was on the One Health Committee for AAVMC and in 2013 we took an inventory of all the veterinary schools to assess readiness for One Health initiatives," he said. "Nationwide, more and more veterinary colleges and schools are embracing the One Health concept. At the annual AAVMC meeting in 2013 (which had a record attendance), One Health was the theme of the entire meeting and has become a key AAVMC platform moving forward."

One Health is different from One Medicine, which was a well-established concept, but from a more focused perspective. "One Medicine had a narrow focus, primarily related to comparative pathology and physiology between human and animals. One Health is a more comprehensive concept, looking at the comparisons between animals, people and the environment."

Dr. Lairmore points to some visionary ACVP members who helped move the medical community toward One Health. "Dr. Linda Lowenstein and Dr. Linda Munson were pioneers in not only looking at wildlife, but the environment impacting animal health. Both were entrepreneurial – seeking independent funding to advance the health of wildlife because they saw an opportunity for a bigger vision that would have worldwide impact. Dr. Bennie Osburn was another pioneer in this area." "While dean at UC Davis School of Veterinary Medicine, Dr. Osburn and Dr. Jonna Mazet helped establish the Wildlife Health Center, which later grew into the One Health Institute."

At UC Davis, One Health was already part of the mission when Dr. Lairmore became the dean in 2011. "We embarked on a strategic planning initiative to refine and refocus our mission," he recalls. "We had a long history in comparative pathology

and One Medicine. Dr. Calvin Schwabe, considered a founding father of veterinary epidemiology and One Medicine, began working on visionary initiatives in the 1960s and 1970s. Dr. Peter Kennedy, an early diplomate of ACVP, had a lifelong interest in learning about the similarities in animal and human diseases. Dr. Donald Dungworth did some amazing work as an expert in the field of inhalation toxicology and comparative pathology. The work of these pioneering veterinary pathologists provided critical information about both animal and human disease processes. And the list goes on and on for veterinary pathologists who began to compare and interface human health and animal health."

A big breakthrough came in the mid 1980s when veterinary pathologists and microbiologists discovered a link between simian retroviruses, such as simian immunodeficiency virus (SIV) and HIV. Virus strains from two primate species are believed to have crossed the species barrier into humans, resulting in HIV-2 and HIV-1, respectively. The most likely route of transmission of HIV-1 to humans involves contact with the blood of non-human primates that are often hunted for bush meat in Africa.

More about the One Health Institute

The National Institutes of Health (NIH), the United States Agency for International Development (USAID) and other federal agencies have continued to this day to fund additional research related to One Health. "Today, most of our basic and translational research programs have a common One Health connection," said Dr. Lairmore. "It has been very successful. Our scientists and researchers are working collaboratively on many initiatives to advance the health of people, animals and the environment."

The One Health Institute, lead by its Director, Dr. Jonna Mazet, is home to many diverse programs, including the Wildlife Center, which is doing amazing work in caring for wildlife suffering from oil spills, assisting gorilla doctors protect the health of endangered mountain gorillas in Rwanda and other conservation efforts. It is also home to the California Raptor Center, an educational and research facility dedicated to the rehabilitation of injured and orphaned birds of prey (raptors). Dr. Lairmore invites you to take a look at the many programs taking place at the One Health Institute. Each is making a difference for millions of people around the world in many different ways.

Another project that Dr. Lairmore is excited about is PREDICT 2 – one of the largest projects in the world designed to advance diagnostics, genomics and informatics to collect genetic and epidemiologic data, resulting in the most comprehensive zoonotic surveillance project in the world. "To date, USAID has invested more than $100 million in having interdisciplinary teams investigate and learn more about what's to come. Veterinarians are driving many of these teams, but all are focused on risk determination. If there are people dying, if animals are dying – the teams concentrate first on species that are known transmitters (primates and bats).

Veterinary pathologists are often part of these teams on the ground to determine the cause of death of animals at the interface with humans. The PREDICT teams have trained more than 2400 people in targeted regions ready to deploy to the frontlines of a disease outbreaks. In One Health programs, like PREDICT, ACVP members have been instrumental in protecting the health of animals and people."

In addition to veterinary pathologists, researchers, physicians and epidemiologists, One Health initiatives include the social sciences and multi-cultural experts. "The world is very complex. For instance, in some parts of China, some view dogs as pestilence; others herd them. Understanding the nuances of each culture will be critical to being successful with this initiative. In some ways, I see veterinarians as the bridge builders – bridging the gap in the medical community to bring about understanding."

Dr. Lairmore and One Health

Dr. Lairmore actually started his comparative medicine training while completing his anatomic veterinary pathology residency training and PhD degree at Colorado State University (CSU) investigating ovine progressive pneumonia under the mentorship of ACVP member, Dr. James DeMartini. "My primary emphasis at the time was to learn ruminant immunology," he said. "While I was in Dr. DeMartini's lab, the AIDS virus (later called human immunodeficiency virus, HIV) was found to be related to the ovine lentiviruses studied in Jim's lab". "Thus, while I was studying a sheep retrovirus, we were adding to the HIV literature". "ACVP member, Dr. Edward Hoover was chair of the Veterinary Pathology Department at Colorado State University at the time, and helped promote a rich environment to learn about retroviruses using a comparative approach. A National Cancer Institute (NCI) supported training grant at CSU that was instrumental in helping train a number of veterinary pathologists in this comparative medicine style."

In 1984, the National Cancer Institute (NCI) contacted the team to understand more about how animal retroviruses compared to human retroviruses. "It was an exciting time to know we were helping leading scientists around the world learn about how these types of viruses replicated and caused disease." After completing his Ph.D. at CSU, Dr. Lairmore moved on to the Centers for Disease Control (CDC) in Atlanta, Georgia, working closely with Dr. Fred Murphy, a noted virologist. Dr. Lairmore's research shifted to focus completely on human retroviruses, specifically human T-cell leukemia virus (HTLV-1), a close relative of bovine leukemia virus (BLV).

From the CDC, Dr. Lairmore was recruited to The Ohio State University, College of Veterinary Medicine where he eventually became a professor and associate dean for research and graduate studies at the College of Veterinary Medicine. He also served as an associate director of the university's Comprehensive Cancer Center. Lairmore is now one of the few veterinarians elected as a member of the Institute of Medicine (now the National Academy of Medicine) of the National Academies of Science, which is one of his proudest achievements. He is also a Fellow of the American

Academy of Microbiology and the American Association for the Advancement of Sciences.

Dr. Lairmore's research has provided significant breakthroughs in the biology of the human retroviruses and the understanding of viral-associated carcinogenesis. He developed one of the first models of AIDS-associated pediatric pneumonia.

Today, as dean of one of the most prestigious veterinary institutions in the world addressing One Health, he reflects, "For me, my career started with a One Health concept. The comparative approach is just part of who I am and I couldn't be more excited to see what the future holds as the concept really takes off."

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